



Intelligent Transportation Systems
U.S. Department of Transportation



VII – Opportunities and Challenges

***2006 NCDOT Statewide Incident Management and
Intelligent Transportation Systems Conference***

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Topics Covered

- Background
- What is VII
- Applications and Opportunities of VII
- Basic Operating Concept
- What are the Issues Effecting Deployment
- Current DOT Activities



Recent Safety History

- Highway Crashes Account for 42,000 Deaths and \$230 Billion Economic Loss Annually
- Aggressive Efforts Have Positively Impacted Crash Rates and Numbers
- Leveling Off of Gains in Recent Years
- Increase in VMT Likely to Result in Increased Crashes
- Additional Improvements Can Be Realized Through Active Safety Systems, i.e., Crash Warning and Crash Avoidance
- Cooperative Systems Offer the Potential for Significant Safety Gains



Congestion is Choking Our Future

- Congestion Will Increase by 50% in 10 Years
- Congestion Has Grown 400% in 20 Years in Small Cities
- Americans Will Spend a Week Stuck in Traffic Each Year
- ITS Solutions (Adaptive Signals, Ramp Metering, Traveler Information) Can Reduce Delays and Improve Reliability
- Lack of Accurate Real-time Information Is the Primary Limitation to Improved Operations

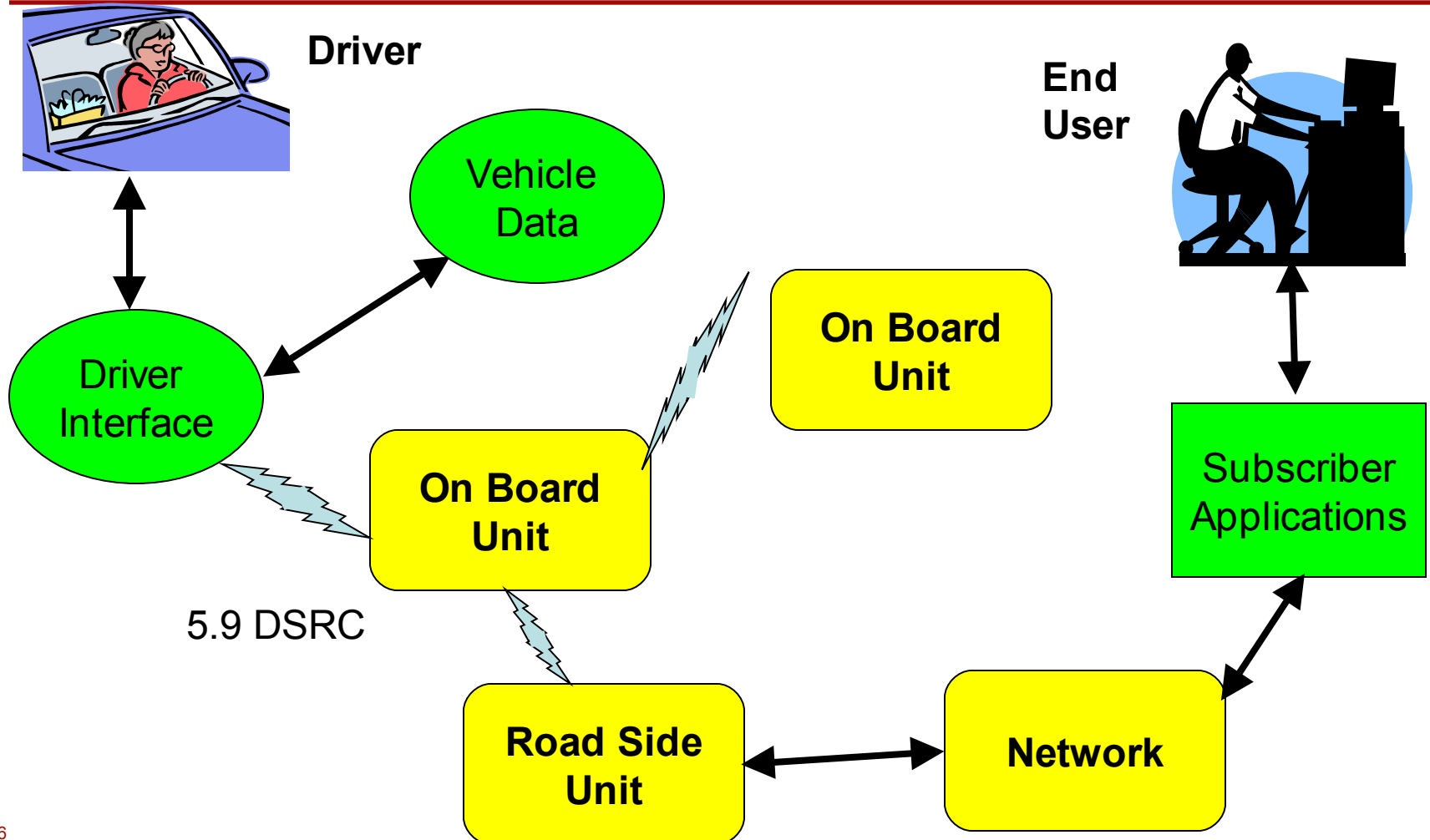


What Can We Do

- Current Strategies Can Continue to Make Minor Improvements
- What is Needed is a New Approach
- Vision: The Establishment of Vehicle to Vehicle and Vehicle to Roadside Communication Capability Nationwide – Vehicle Infrastructure Integration
- Purpose: To Enable a Number of New Services That Provide Significant Mobility, Safety and Commercial Benefits



Concept of VII





VII Can Enable a Wide Range of Applications

- Cooperative Safety Systems
- Active Probe Vehicles
- Road Pricing
- Commercial Applications



Cooperative Safety Systems

- Primary Examples
 - Intersection Collision Avoidance
 - Road Departure Warning
- Other Opportunities
 - Work Zone Management
 - In-Vehicle Signing
 - Wireless Truck Inspections



Probe Vehicles

- Vehicle to Roadside Communication Would Enable Vehicles to Act as Active Probes
- Data from Existing Vehicle Based Sensors Could be Communicated to Roadside
- Example Information
 - Average Speed and Travel Time
 - Incident Detection
 - Onset of Precipitation
 - Road Condition
- Broad Network Coverage



Highway Financing

- Electronic Toll Collection
- High Occupancy Toll (HOT) Lanes
- Innovative Road Pricing Strategies
 - Mileage Based
 - Facility Based
- Congestion Pricing



Commercial Applications

- A Wide Range of Commercial Services Will Likely be Enabled
 - Electronic Payment for Services
 - Personalized Traveler Information
 - Dynamic Route Guidance
 - Info-tainment
 - Fleet Management
 - Asset Tracking
 - Cargo Monitoring and Security



The Challenge

- No One Application Will Justify Deployment
- No One Entity Can Cause Deployment
- Cooperative Deployment Venture Needed
- Simultaneous Deployment Required
 - 12 Million Vehicles Annually
 - Nationwide Network of Roadside Units
 - 130,000 Units in Three Years
 - Additional 120,000 for Complete Coverage
- Nationwide Operations



VII Initiative

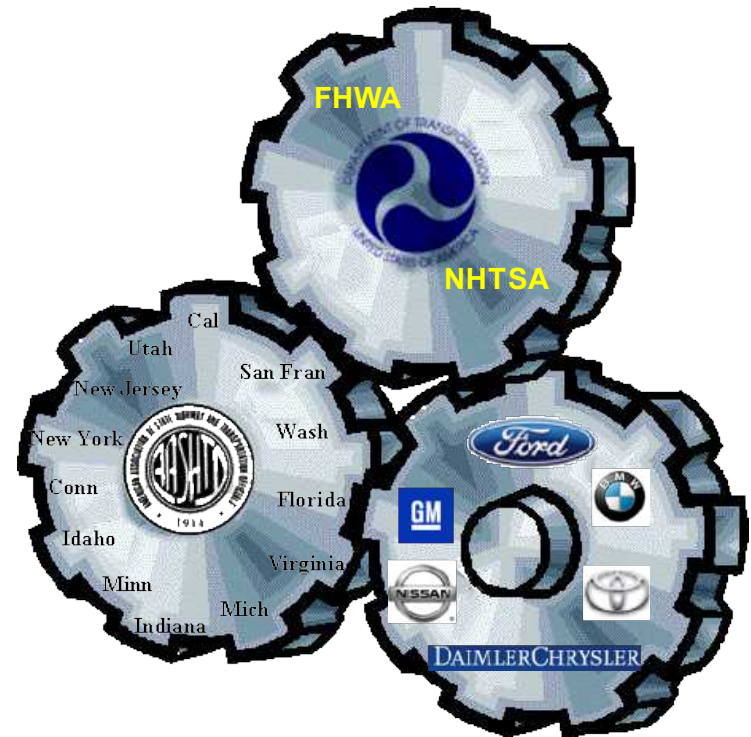
Objective: To Determine the Feasibility (Technical, Economic, Social/political) of Deploying VII

Milestone: A Deployment Strategy for VII



VII Coalition

- USDOT
- AASHTO
 - 10 State DOTs
- IBTTA
- Local Government
- Vehicle Manufacturers





Issues Effecting Deployment

Several Key Issues Will Have to Be Resolved:

- Technical Implementation
- Institutional Issues
- Business Models/Deployment Strategies



Technical Implementation

- Communications
 - DSRC Development and Standards
- Overall System Design
 - Onboard Units
 - Roadside Units
 - Network
- Applications
 - Day One Applications
 - Future Applications

**STATUS: Standards Nearly Complete. System Design Underway.
Proof of Concept Test Plan Under Development. Applications
Under Development**



Policy Issues

- Privacy
 - Protection of Individual Privacy
 - Perception of Privacy
- Data Access
 - Who Has Access to What Data
 - What Data Is Free
- Liability
 - Public Sector
 - Private Sector

STATUS: Privacy Policies Developed. Data Access and Liability Issues Not Yet Addressed



Business Models/Deployment Strategies

- System Must be Deployed, Maintained and Operated
- Security Must be Maintained
- National Model Necessary
- Various Options Being Evaluated
 - Private Sector
 - Public Sector
- Comprehensive Cost Benefit Analysis Required

STATUS: Various Governance Models Have Been Identified and Analyzed. Expert Workshop Planned. Cost Benefit Analysis Underway.



Summary

- VII Offers the Opportunity to Revolutionize Surface Transportation
- Program on Fast Track
- Challenges are Significant if Not Daunting
- Partners Are Committed
- VII Will Succeed



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SAFETEA-LU §1201: Real-Time Systems Information Management Program





Topics Covered

- Background
- US DOT Approach
- Stakeholder Reaction
- Conclusions
- Next Steps



Legislation

- **SAFETEA-LU, Subtitle B, Section 1201**

- ***Congestion Relief***
- ***Real-Time System Management Information Program***

• “The Secretary shall establish a real-time system management information program to provide, in all States, the capability to monitor, in real-time, the traffic and travel conditions of the major highways of the United States and to share that information to improve the security of the surface transportation system, to address congestion problems, to support improved response to weather events and surface transportation incidents, and to facilitate national and regional highway traveler information.”



Legislation (cont.)

•Data Exchange Formats

- “Not later than 2 years after the date of enactment of this Act, the Secretary shall establish data exchange formats to ensure that the data provided by highway and transit monitoring systems, including statewide incident reporting systems, can readily be exchanged across jurisdictional boundaries, facilitating nationwide availability of information.”
- “States shall incorporate the data exchange formats established by the Secretary ... to ensure that the data provided by highway and transit monitoring systems may readily be exchanged with State and local governments and may be made available to the traveling public.”



Program Context & Funding

- ***Context***

- Information needs for transportation systems management & operations
- Basis for decisions on the performance of the transportation network

- ***Funding***

- No funding specific to Program
- Federal-aid eligibility
 - NHS
 - STP
 - CMAQ
- SPR may be used for planning real-time monitoring systems



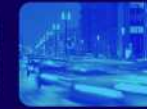
USDOT Approach

- **Craft proposed description of the Program**
- **Address existing systems**
- **RFI published in May 4 *Federal Register***
 - Program Description
 - Request for Information (60-day comment period)
 - Data Exchange Formats
 - Goals & Outcomes
 - Program Definitions
 - Program Parameters
 - 42 responses received by July 3, others received after July 3 also considered by FHWA



Program Description: Data Exchange Formats

- **Assess existing standards for feasibility and applicability**
- **Center-to-Center standards as basis**
- **Example list of 24 standards in RFI, including TMDD, IEEE 1512, SAE – ATIS, Location referencing, NTCIP – ESS, TCIP**
- **Inventory of existing systems will provide additional information**



Program Description: Goals & Outcomes

- **Goals (*By September 30, 2009*):**
 - Establish in all States a basic real-time information system
 - Identify longer range real-time monitoring needs; develop plans & strategies
 - Provide capability to share data
- **Outcomes**
 - Publicly available Web site
 - 511
 - Regional ITS Architectures reflect systems
 - Access to data through Internet



Program Description: Goals & Outcomes (cont.)

Questions: Goals

- Does September 30, 2009, represent a reasonable time period for implementing the Real-time System Management Information Program? What potential obstacles would prevent program implementation by this date? What would be a reasonable time frame for implementing the program?

Responses

- Most generally agreed with scope; some disagreed with the timeline
- Suggested alternatives included a 5-year delay and a phased approach by region, coverage, data content, or data quality
- State DOTs: could meet some program goals by 2009
- Private Sector: 2009 reasonable & program goals can be achieved more quickly



Program Description: Goals & Outcomes (cont.)

Questions: Outcomes

- Are the proposed outcomes appropriate for gauging the success of a system implemented under the program? What other measures for success would be useful?

Responses

- Proposed outcomes reasonable for USDOT but states would need different, additional measures to determine performance of their specific system (local)
 - geographic coverage
 - customer acceptance
 - data quality



Questions: Outcomes

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Program Description: Program Definitions

- **Major Highways**
 - NHS, limited-access roads
 - Major arterials in metro areas
- **Traffic & Travel Conditions**
 - Road & lane closures (construction, incidents, weather)
 - Adverse roadway weather conditions
 - Congestion
 - Travel times in congested metro areas
 - Transit service disruptions in metro areas



Program Description: Program Definitions (cont.)

Questions

- Is this proposed definition of “major highways” adequate and appropriate for the purposes of the Real-time System Management Information Program?

Responses

- Requests for flexibility in deciding which roads to cover
- Rural & urban areas might have different needs for coverage



Program Description: Program Definitions (cont.)

- **Traffic & Travel Conditions/Real-Time**

- Construction closures / openings within 30 minutes; 15 minutes in metro areas
- Confirmed road or lane blocking incident information within 15 minutes
- Roadway weather conditions updated at least 30 minutes
- Congestion information updated at least 15 minutes
- Travel times reflect conditions no older than 10 minutes
- Transit disruptions updated at least 30 minutes



Program Description: Program Definitions (cont.)

Questions: Traffic & Travel Conditions

- How well do the proposed traffic and travel conditions represent reasonable and appropriate basic requirements for the Real-time System Management Information Program?

Responses

- General support for including travel times and speeds, with extent & degree of congested conditions
- Disagreement to include information on public transportation disruptions & weather & construction information



Program Description: Program Definitions (cont.)

Questions: Real-Time

- How well do the proposed criteria for real-time information represent reasonable and appropriate minimums for systems implemented under the Real-time System Management Information Program?

Responses

- General support for proposed definition of “real-time” for congestion, travel time, & lane blockage information
- Several respondents, including state DOTs, noted that more stringent — 5 minutes or less — would be more useful to the public



Program Description: Program Parameters

- **Information Quality – “Good”**
- Accuracy
 - Minimum of 85% accuracy
- Availability
 - Minimum of 90% availability

Based on “Data Gap Workshop” results
“Good” – “Better” – “Best” descriptions



Program Description: Program Parameters (cont.)

Questions: Information Quality

- How well do the proposed attributes present reasonable minimum requirements for systems implemented under the Real-time System Management Information Program? Are any other minimum requirements necessary?

Responses

- Alternatives for quality and accuracy proposed but no general consensus
 - more stringent measures suggested
 - weaker measures suggested
 - agreement with proposed USDOT measures



Existing Systems

- **Program would:**
 - be developed to take advantage of existing systems & information sharing
 - build upon existing system where applicable
 - complement current performance reporting systems



Existing Systems (cont.)

Questions

- What system used? What types of information? How is information shared with the public? How broadly is information shared with other agencies? What data standards are used?

Responses

- Nearly all respondents provided information on systems deployed systems in their area



Summary

- Overall, scope of the program was reasonably supported
- Despite dissenting opinions, the suggested alternatives were not widely supported
 - *meaning no specific alternative was more popular with regards to data elements, data quality, coverage, etc., than the parameter proposed in the RFI*

To review the docket submissions, visit the Document Management System (DMS) at <http://dms.dot.gov/submit>.

Use docket number FHWA–06–24219



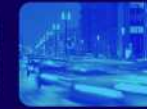
Next steps

- **Leverage organizations' activities**
 - ITS America
 - Annual Meeting
 - Web conferences
 - I-95 Information Forum
 - TRB / AASHTO mid-year meetings
- **Continue detailed overview of comments to refine Program**
- **Coordination with NCHRP 20-7, Task 215**
 - “Statewide Incident Reporting Systems”
- **Develop & Issue Program Guidance Based on Implementation by end of year**



Resources & Contacts

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Thank you